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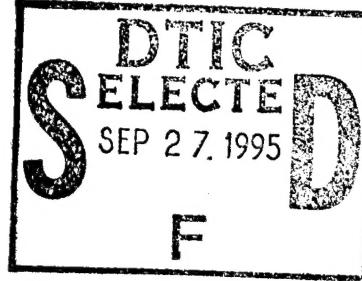
MICHAEL J. JACKSON
Executive Director

JOHN R. RICE, C.P.A.
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OFFICE OF SCIENTIFIC MEETINGS
AND CONFERENCES
GERI GOODENOUGH
Director

November 2, 1994

Dr. Joel L. Davis
Scientific Officer Code: 342CN
Office of Naval Research
800 North Quincy Street
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Dear Dr. Davis:

Enclosed is the final report to the Department of Navy, Office of Naval Research, for Grant Number N00014-94-1-0701, in support of the FASEB Summer Research Conference, "Biology, Chemistry and Modelling of Vision: Visual Processing," for the budget period May 1, 1994 through September 30, 1994. This report includes the Chairman's Summary, the program, and the list of participants. The financial statement will be sent under separate cover.

The Federation and the scientists who participated in the conference sincerely appreciate the interest and support provided by the Office of Naval Research.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael J. Jackson".

Michael J. Jackson, Ph.D.
Executive Director

MJJ:afh
enc.

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FINAL REPORT

to the Department of Navy, Office of Naval Research

**CONFERENCE GRANT: FASEB Summer Research Conference on
"Biology, Chemistry and Modelling of Vision:
Visual Processing"**

GRANT NUMBER: N00014-94-1-0701

PERFORMANCE PERIOD: 5/1/94 through 9/30/94

GRANT AMOUNT: \$5,000

PRINCIPAL INVESTIGATOR: Richard Masland

**GRANTEE INSTITUTION: Federation of American Societies for
Experimental Biology
9650 Rockville Pike
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DATE OF REPORT: November 2, 1994

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FASEB Summer Conference on
"The Biology, Chemistry and Modeling of Vision"
June 25-30, 1994 - Saxtons River, Vermont

This year's vision conference had 38 invited speakers. Sessions concentrated on:
1) Retinal Cell Populations, 2) Mechanisms of Synaptic Communication, 3) Mechanisms of Lateral Conduction, 4) Parallel Information Flows, 5) Primate Color Vision, 6) Retina-based Hardware, 7) Bipolar Cell Axon Terminals, and 8) The Control of Ganglion Cell Excitation.

The meeting was enlivened by several important break-throughs and interesting controversies. There was an excellent paper by Dr. Enrica Strettoi on the organization of the inner retina. She has found a way to determine finally the densities of the different retinal cell sub-populations. Elio Raviola presented exciting new methods combining molecular biology and anatomy for the study of cell populations. An exciting session organized by Denis Baylor had three presentations on the use of multi-electrode arrays for analyzing the retinal output. The technical part (using multi-electrode arrays) is now solved. The excitement lies in trying to decode the message sent to the brain. Markus Meister gave a particularly stimulating talk, in which he proposed that the action of amacrine cells is indirectly communicated to the brain via the cross-correlation between neighboring retinal ganglion cells.

The folks who study primate color vision are making big progress. The anatomists have reconstructed the pathway from individual color classes of cone to bipolar cells and then to ganglion cells. Although details remain to be solved, the algorithm appears to be in place. With nice symmetry, the electrophysiologists, notably Dennis Dacey, have learned to record from individual ganglion cells in isolated monkey retinas and then inject them with markers. Taken together, these two approaches should unravel the wiring of primate color vision.

Another highlight was a controversy about the activity of amacrine cell dendrites. Amacrine cells remain an enigma. Several groups, however, are succeeding in recording from them. There is some disagreement about whether or not amacrine cell dendrites make action potentials. The meeting was a useful focus for this discussion and left everyone buzzing. By the time of the next meeting, this too will probably be solved.

A number of presentations concerned the channels present in various classes of retinal neuron. Once again, steady progress is being made. Methods for studying single channels are now beginning to be applied in intact retinas. The consequence will be a much better description of the events that control the final retinal ganglion cell output.

The meeting was enthusiastically received and enrollment was 40% above the previous conference. Judging from the responses to this meeting, the next conference may be oversubscribed.

A number of people came from abroad: perhaps a dozen from Europe, a half-dozen from Australia, and about the same number from Japan. The remaining participants came from throughout the United States. There was some bias toward the east coast, but not a great one.

This year the co-chairmen systematically sought to invite younger workers to speak. Approximately one third of the presentations were by scientists aged under 35. This was extremely successful. The younger speakers worked harder at their talks, which were much better than those of the veterans. Having younger speakers also served to make all the younger members of the conference feel more welcome. I hope that this is a tradition that can be continued.

FASEB Summer Research Conference on the Biology, Chemistry and Modeling of Vision: Visual Processing

**Vermont Academy
Saxtons River, Vermont
June 25-30, 1994**

Saturday

REGISTRATION

2:00 - 12:00	Office open for registration
2:30	Bus leaves Logan Airport
5:00	Bus arrives at Vermont Academy
6:00	Dinner

Sunday - 9:00 a.m.

INTRODUCTORY REMARKS

Sunday - 9:30 a.m.- noon

RETINAL CELL POPULATIONS

John Dowling, Chair

David Vaney Tracer Coupling: Use and Abuse

Enrica Strettoi The Organization of the Inner Nuclear Layer in the Rabbit Retina

Elio Raviola Retinal Cell Populations

Sunday - 7:30 p.m.-10:00 p.m. MECHANISMS OF SYNAPTIC COMMUNICATION

Eric Schwartz, Chair

Eric Schwartz Transport Mediated Transmitter Release

Fred Rieke Regulation of Exocytosis in Vertebrate Photoreceptors

Ann Stuart Histamine: The Neurotransmitter at Sign-Reversing Photoreceptor Synapses in Arthropods

Robert Barlow Brain Modulation of the Retina

Monday - 9:00 a.m.- noon

MECHANISMS OF LATERAL CONDUCTION

Gordon Fain, Chair

Paul Cook Change-Sensitive Inhibition in the Amphibian Retina

Stewart Bloomfield Active Propagation of Synaptic Currents in the Dendritic Arbors of Amacrine Cells and the Formation of Receptive Fields

Bruce Peters Receptive Field and Voltage Gated Currents of Starburst Amacrine Cells

Jimmy Zhou Patch-Clamp Recordings from Starburst Amacrine Cells in Rabbit Retinal Slices

Monday - 7:30 p.m.-10:00 p.m. **PARALLEL INFORMATION FLOWS**

Denis Baylor, Chair

Steve DeVries Spatial Sampling by Ganglion Cell Receptive Field Mosaics in Rabbit Retina

Markus Meister Concerted Signals from the Retina

Rachel Wong Multicellular Recording of Retinal Neurons Using Calcium Imaging Techniques

Tuesday - 9:00 a.m.- noon

PRIMATE COLOR VISION I

Brian Boycott, Chair

Gerald Jacobs Photopigments Underlying Primate Color Vision

Ehud Kaplan The Receptive Field of Primate Ganglion Cells: Space, Time and a Splash of Color

Christine Curcio Foveal Cones and their Outputs to Ganglion Cells

Orin Packer Photopigment Transmittance Imaging of the Primate Photoreceptor Mosaic

Tuesday - 7:30 p.m.-10:00 p.m. PRIMATE COLOR VISION II

Heinz Wässle, Chair

David Calkins	Circuitry for Spectral Coding in the Primate Fovea
Dennis Dacey	Intracellular Responses of Morphologically Identified Ganglion Cells: Evidence for Cone-Type Specific Circuitry in the Inner Retina
Paul Martin	Sources of Chromatic Specificity in Primate Retinal Ganglion Cells

Wednesday - 9:00 a.m.- 12:30 p.m. RETINA-BASED HARDWARE

John Wyatt, Chair

Misha Mahowald	Common Principles in Retinal and Cortical Processing
Kwabena Boahen	Speed Sensitivity in a Retinomorphic Chip: Modelling Spatiotemporal Behavior of OPL and Neuroanatomy of IPL
Andreas Andreou	48,000 Pixels, 1/2 Million Transistors Contrast Sensitive Silicon Retina
Frank Werblin	Physiologically-Based Neuromorphic Retina
John Wyatt	Steps Toward the Development of a Silicon Retinal Implant

Wednesday - 7:00 p.m.-7:30 p.m. BUSINESS MEETING

Wednesday - 7:30 p.m.-10:00 p.m. BIPOLAR CELL AXON TERMINALS

Akimichi Kaneko, Chair

Robert Marc	Local Circuitry of Cyprinid Bipolar Cell Axon Terminals
Masao Tachibana	Ca ²⁺ Regulation in the Presynaptic Terminals of Goldfish Retinal Bipolar Cells
Gary Matthews	Exocytosis and Endocytosis in Bipolar Cell Synaptic Terminals

Thursday - 9:00 a.m.-11:30 a.m. CONTROL OF GANGLION CELL EXCITATION

David Copenhagen, Chair

Akimichi Kaneko	Fast and Slow Kinetics of Voltage-Dependent Na Channels in X and W cells of the Cat Retina
Jeff Diamond	The Relationship Between Light-Evoked Synaptic Excitation and Spiking Behavior of Ganglion Cells
Colin Barnstable	Cyclic Nucleotide Gated Cation Channels as Modulators of Ganglion Cell Function

Thursday

12:00 noon	Bus departs for Logan Airport (box lunch served on bus)
12:00 - 1:00	Lunch
2:00	Office closes
3:00	Bus arrives at Logan Airport

POSTERS

There will be two poster sessions. The first will be Sunday and Monday, the second Tuesday and Wednesday. The bar will be moved to the poster area from 4:00 to 6:00 on those days. Posters will be available for viewing throughout each day.

Supported by the National Science Foundation and the Office of Naval Research.

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